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ABSTRACT

This report of Virginia's Commission on the University of the 21st Century first examines the changes occurring within Virginia in its transition from an agricultural/industrial state into one heavily involved in information and technology. Next, the need to increase literacy in mathematics, science, and technology is discussed, as is the need to increase students' ability to use sophisticated technology. Potential effects of technology on academic life and the college/university environment are also examined. Additional sections consider: (1) the problems and concerns caused by a currently aging academic faculty and ways to improve faculty vigor; (2) the need for Virginia to recognize and foster unsponsored research and acknowledge the value of research being done in the state's colleges and universities; (3) the more complex relationships that will exist between society and universities in the next century; (4) the need to make faculty feel like a part of the university or college rather than affiliated only with a specific discipline or department; (5) issues surrounding autonomy, diversity, and cooperation; and (6) the need to reward cooperation, risk-taking, and innovation in higher education governance. Recommendations concerning issues of change and growth conclude the report. (GLR)

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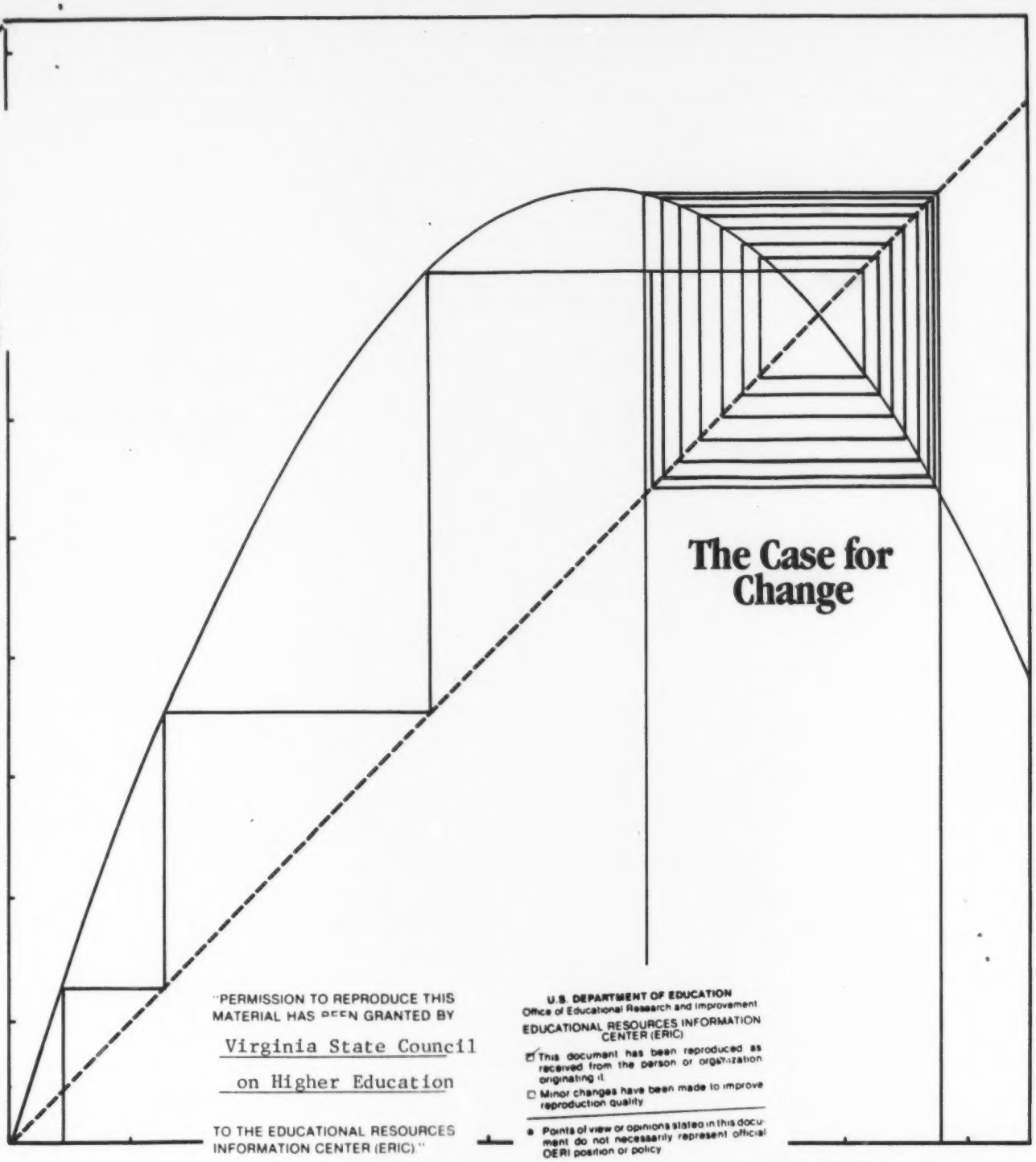

The Case for Change

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Commonwealth of Virginia • Commission on The University of The 21st Century

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I know of no safe depository of the ultimate powers of society than the people themselves, and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion.

—Thomas Jefferson

There is, it seems to us,
At best, only a limited value
In the knowledge derived from experience.
The knowledge imposes a pattern, and falsifies.
For the pattern is new in every moment
And every moment is a new and shocking
Valuation of all we have been.
—T. S. Eliot, "Four Quartets"

THE CASE FOR CHANGE

I. The Nation and The World

The Virginia Commission on the University of the 21st Century was created by the 1988 Session of the General Assembly. The Governor charged the Commission to develop a vision of higher education to meet the demands of the next century.

The Commission has reviewed information about changes in Virginia's population and probable growth in enrollments during the next 20 years. It asked for a long-range economic forecast for the state. It has heard about student characteristics, ways in which different students learn, and ways in which the behavior of persons working and studying within colleges and universities create an implicit curriculum—a set of values and way of looking at the world—that affects what people learn.

The Commission also requested specific presentations from state officials and college and university presidents. In hearings held across the state, it has been told about needs for additional higher-education services, often closer to homes and places of work.

Science fiction makes people aware that the way things are is not necessarily the way they have to be. The Commission considered and rejected the possibility of taking a highly speculative approach to its work. At the other extreme, we considered and rejected the possibility of preparing a detailed plan for Virginia higher education in the next century. The regular planning processes seem to have worked well and we neither wanted nor had the time and ability to supercede them. Besides, we were asked for a vision, not a plan.

So we have chosen a middle road, trying to be visionary yet pragmatic, imaginative yet grounded in the way things are. We have tried to think like citizens responsible to our colleagues and to succeeding generations. We have tried to write a script for the future that, true to our democratic tradition, will be enacted by many not by few.

From this perspective, the "University of the 21st Century" will be an institution responsible for proposing, evaluating and assimilating new ways of behaving based upon new perceptions and ideas about human beings, knowledge and practice, and the world in which we live. Moreover, it will be not just a place, but a network of resources—faculty, students, equipment, libraries, classrooms and laboratories—all linked together electronically as well as physically.

After hearing and reading of many possibilities, the Commission thinks that the basic question with which we are dealing is this: "How can Virginia cause constructive and fundamental change within its colleges and universities so they will be ready to meet the demands of life in the 21st century?" We are looking for ways to encourage risk-taking within institutions that are, like those elsewhere, conservative and cautious about change.

We ask our question with a strong sense of urgency, not just because enrollments will swell, but because the world's social and economic orders are changing at an unprecedented pace that appears to be accelerating. Unfortunately, that pace is also creating a backlash against modernization in certain quarters, causing some to retreat from change or to deny its necessity. Virginia recognizes the responsibilities and possibilities of change and has historically played a vital role in determining the course of humankind.

As we write this report, the United States is struggling with huge debt and trade deficits, rates of productivity that are not competitive with those of several other nations, and the enormous social costs of drug addiction and inadequate schooling for many.

We also face significant changes in our society: an aging population; growing numbers of poor people, especially children; distressingly high rates of functional illiteracy; drug use at an epidemic level; AIDS; the emergence of new patterns of family living. Teaching people to cope with some of these problems and to solve others—and helping them learn which are which—are among higher education's major responsibilities.

Totalitarian governments and state-run economies are being called to account, leading to reform movements worldwide. The European Economic Community is moving toward a consolidation of interests that may make it, after 1992, the greatest concentrated economic power in the world.

These issues are but a handful of the most visible. There also is the dominance of Japan in the world's markets; the rapid emergence of other Pacific rim nations as major producers of goods; and continuing political, economic, and social problems that plague emerging nations on three continents. As a world leader the United States must be concerned

We no longer live in the time when some states or even an important group of states could decide everything in the world. Today we need a consensus, an international approach to global problems — not because it is a moral imperative, but for objective reasons, because the world is a single and interdependent whole.
— Eduard Shevardnadze

In the beginning all the world was America
— John Locke

The world is made of grace, and the important thing is to understand that ... we are all struggling between values
— Carlos Fuentes

Science fiction is important because it fights the natural notion that there's something permanent about the way things are right now.
— Isaac Asimov

with all of this and so must the State of Virginia.

The state of the environment has become an issue of pressing concern for persons of all political persuasions around the world. Toxic waste, the greenhouse effect, depletion of the ozone layer, acid rain — these are problems that respect no national borders.

These great global changes come at a time when American education is under as much criticism as it has experienced at any time during the last half of this century. Here are some of the major themes in the chorus of dissatisfaction with education.

- Business leaders, politicians, and educators are saying that our elementary and secondary schools are not performing up to the mark. Although there are methodological difficulties, comparative assessments among industrialized nations seem to confirm the charges.
- While our schools in general are not producing the prepared graduates that we need, we also recognize wide disparities among schools. Depending upon the will and ability of localities to support their schools, school systems fall along a spectrum from educationally affluent to impoverished.
- The nation's colleges and universities enroll more students than they ever have and afford access to higher education to an extent unparalleled in the world. Our best institutions are the envy of other nations. Each year, more than 350,000 students come here from other countries for their higher education. But again, Americans and their leaders sense that the quality of higher education is very uneven across more than 3,000 institutions, and that equal access for all students remains a problem.
- Vigorous debates are under way about how to make the curriculum reflect global and multi-cultural realities while preserving education in our western heritage; about the proper balance between general and specialized or professional education; about how to encourage greater attention to math and science education; and a variety of other issues.
- Underlying all of this, Americans appear uncertain about the issues of who benefits from higher education (individuals or society), who should pay for it, and how much it should cost. We also are aware of the burden of the federal budget deficit and debt that may damage the systems of public and private higher education as we know them.

While there is confusion and cause for concern, the intensity of public discussion about our nation's educational systems is a hopeful sign: the American people know that the future will be shaped in our schools and colleges as well as in our factories, governments, and other social institutions.

The importance of higher education in this time of rapid and often unpredictable change cannot be overemphasized. Virginia's colleges and universities are a wellspring of new ideas, technologies, and human talent for the state and the nation. They are the places where adolescents enter into young adulthood and where older adults acquire the continuing education that helps them remain useful human beings. They are places where new knowledge is created, both to improve the material conditions of our lives and to enrich our spirits.

At least since the establishment of the land-grant colleges and universities in the last century, America's colleges and universities have provided access and opportunity to ever-greater numbers of students. They have helped to transform the results of laboratory science into better standards of living here and abroad. They have provided the intellectual capital of our democratic government.

As this century draws to a close, we can say that no other nation at any time in human history has extended the educational franchise as broadly as ours. Whatever the shortcomings of the educational systems, those who support them politically and economically are a generous people with implicit faith in the capacity of human beings for self-improvement.

We should continue trying to extend the capacity for self-improvement ever more broadly. For this reason the Commission is committed to the principles of equal educational opportunity, but we want to emphasize the importance of individual initiative in acquiring education. The most important thing we can teach people is that they should want and will need to learn over a lifetime. "If you give a person a fish, you feed him for a day. But if you teach him to fish, you feed him for the rest of his life."

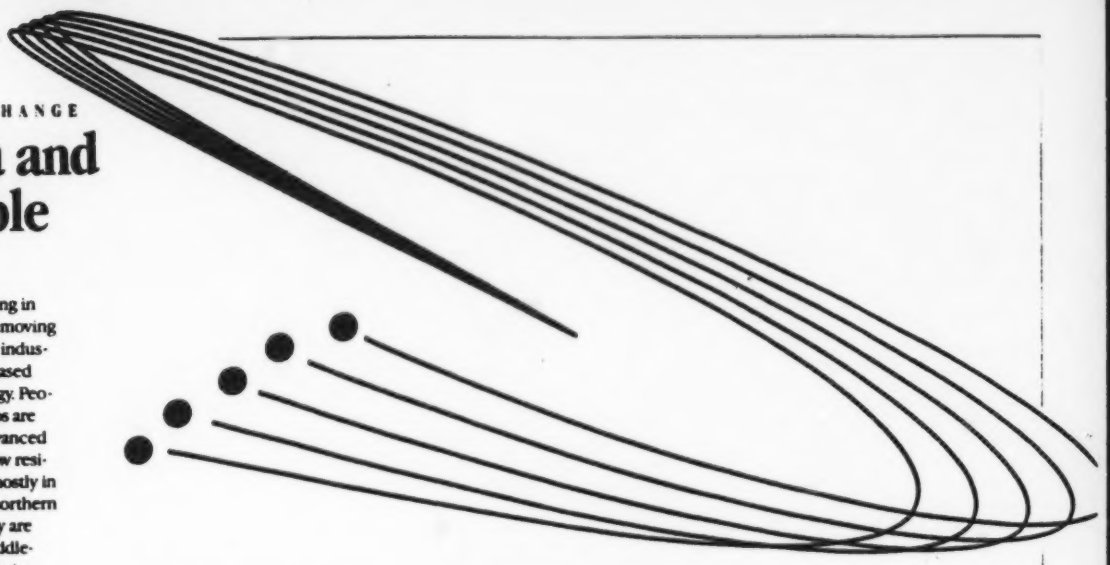
The challenges are changing, and the educational systems must change with them or we shall be left unprepared. Virginia's colleges and universities, which have contributed so much to the development of a modern state in the mainstream of American life, are indispensable as the state undergoes further transformation.

We see Virginia as being in a position to influence educational change nationally, and we judge it worthwhile to try to do so. Quietly, the state's system of higher education has emerged as one of the most highly regarded in the nation. It has been well funded in recent years, and its colleges and universities have been left largely autonomous. Virginia is poised to lead a national movement to change perspectives, curricula, values, and behavior in American higher education.

The Commission offers its thoughts and recommendations for consideration by the people of the Commonwealth and their elected representatives. Looking into the future is a risky business, but we have not so much predicted what will happen as said what we think should happen. We call for a basic transformation in the ways in which Virginia thinks about higher education, colleges and universities think about their responsibilities, and faculties think about knowledge and their disciplines. Some who read our report will think that much of what we envision ought to be going on today in Virginia's colleges and universities. They are right, which is yet another indication of why change is urgent.

THE CASE FOR CHANGE

II. Virginia and Her People



Profound changes are occurring in Virginia. The Commonwealth is moving rapidly from an agricultural and industrial economy to an economy based upon information and technology. People are moving here because jobs are being created in service and advanced technology industries. These new residents of Virginia live and work mostly in the crescent that extends from northern Virginia to Hampton Roads. They are generally well educated and middle-income. They and the industries in which they work (many of which do business globally) need highly sophisticated services from the state's colleges and universities.

Not only are Virginians doing business all over the globe, but the world is coming to the Commonwealth. For example, there are 419 foreign-owned business facilities in Virginia, employing approximately 30,000 citizens. Thirty-five of these foreign-owned businesses came in 1988 alone. Firms from the United Kingdom head the list of these companies employing the most Virginians and investing the most in the state's economy. In 1985, there were five Japanese manufacturing companies located in the state. Now there are 40, representing an increase in investment from $50 million to $500 million.

Agriculture will continue to be an important aspect of the state's economy. But agriculture itself has come to rely upon advanced scientific and technological developments rather than simply upon human labor. The same point can be made about the state's important coal industry, whose future growth is no longer labor-intensive because of technological advances. Both sectors will continue to rely on university research and educated employees, and our colleges and universities should support them in any way possible.

The changes in Virginia are part of global changes that mark the beginning of an era. In advanced nations, technology no longer simply extends our ability to manipulate an essentially inert universe. Now it helps us to create information; to manage large, complex, and diverse systems without inhibiting their development; and to expand the moral, social, and intellectual universe in which we live.

As this new era begins, the population of Virginia will increase and so will enrollment in higher education. While long-range forecasts of enrollment are notoriously imprecise (for the past decade or more, they have underestimated the state's population growth), migration into Virginia and the echo effects of the baby boom combine to make an undergraduate enrollment increase of 30 percent by 2005 quite possible. Increases in graduate enrollment are more difficult to forecast but are likely because the industrial development of Virginia seems to be largely in sophisticated services and advanced technologies. More adults will return to higher education in order to continue learning as their work changes.

The increases will be significant, but are manageable if the state begins now to plan for what probably will happen beginning around 1994. The growth will occur after a bottoming-out period during which the number of Virginia high school graduates will decline and undergraduate enrollments should remain relatively stable.

This period, from 1990 to 1994, should be used to prepare for the decade or more of steady growth that will follow. This means that the state's colleges and universities should re-examine their missions, taking care to reallocate their existing resources so they can be used most effectively after 1994. It means that new forms of public-private partnership should be developed so the state can use its resources to provide the greatest possible variety of opportunities for potential students. It means that future growth should be targeted as carefully as possible to take advantage of the existing capacities of Virginia's state-supported and independent colleges and universities.

As the state's population grows, primarily but not exclusively within the crescent defined by northern Virginia, Richmond, and Hampton Roads, and as new centers of commerce are created, sizeable portions of Virginia and the state's population will not benefit directly from the new wealth and opportunities available. The split between affluent and needy regions of the state could become even greater than it now is. We urge that special attention be given to the needs of persons in geographically disadvantaged regions. Providing access to higher education should continue to be a top priority. This will require different tactics in rural areas than in urban.

We note that young black women and men do not continue their educations at the same rates as their white peers. Virginia's colleges and universities have made great progress in the last 20 years, but they still have not achieved equal participation for all segments of the population. The college-going rate of white high-school graduates has increased by about ten percent in the past ten years, while that of blacks has remained about the same. Even as their numbers have increased in the total population, blacks today represent about the same portion of students in higher education (ten percent) that they represented in 1955. Virginia is not alone among the states in this regard, but substantial numbers of human beings are not developing to their full potential.

The place to begin changing college-going patterns is, of course, in the elementary and secondary schools. It is critically important that people learn to expect that they will continue their educations beyond high school. Early childhood programs and the courses children take throughout elementary and secondary school will determine to a large extent whether they go to college and how well prepared they will be.

Linked to the state's efforts to reduce the number of high school dropouts should be a program that gives young people greater assurance than they have at present that they can go to college whatever their family's ability to pay. The problems of educational disadvantage, social and economic barriers to higher

And now...we must again try to discover what sort of world this is, and why we have been sent hither.

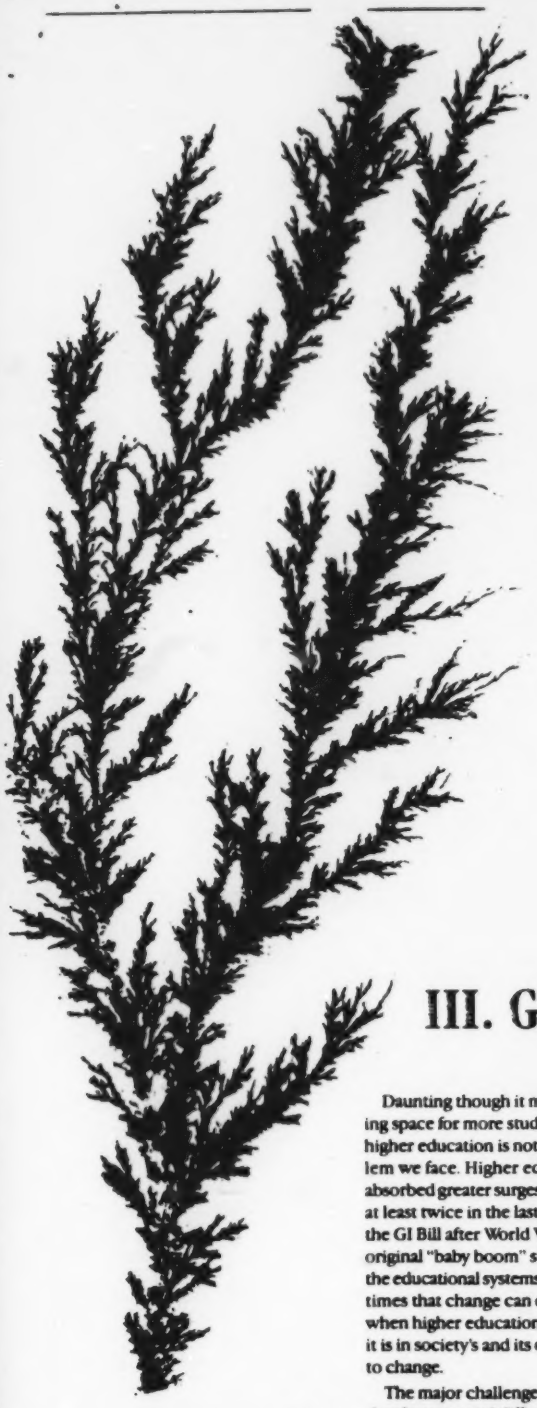
—Nathaniel Hawthorne

Although I do not...believe that the human condition will ever advance to such a state of perfection as that there shall no longer be pain or vice in the world, yet I believe it susceptible of much improvement...and that the diffusion of knowledge among people is to be the instrument by which it is to be effected.

—Thomas Jefferson

The opposite of a correct statement is a false statement. But the opposite of a profound truth may well be another profound truth.

—Niels Bohr



[W]e have need of critics of science...We need people who can tell us how science is done, down to the finest detail, and also why it is done, how the new maps of knowledge are being drawn, and how to distinguish among good science, bad science, and nonsense.

—Lewis Thomas

education, and access are complex. We applaud efforts in communities and in elementary schools across the state to address the needs of special groups of students and to counsel them about their educational opportunities. We also applaud colleges and universities that are working directly with middle and secondary school students to help them prepare for higher education. A coordinated effort from pre-school through higher education is essential to prepare people for learning over a lifetime.

To be realistic, people will stay involved in education only if they perceive that schooling will result in better lives and opportunities. We think it likely that better lives will result from their being able to hold jobs requiring advanced education, either occupational-technical or beyond. Elementary and secondary school students should be aware of career opportunities from the skilled trades to the learned professions. Virginia's colleges and universities should maintain their capacity to prepare students across that range.

Arguably, there are enough students in higher education to fill the best jobs in Virginia's economy. But this argument rests on an assumption we reject: that the major purpose of higher education is to prepare people for jobs. We believe that higher education should help all people develop their capacities to the fullest—as workers, citizens, members of families and other social institutions, and participants in the global community. A broadly educated citizenry is essential to sustain and improve even further the quality of life in Virginia. Programs that alert children and adults to the benefits of higher education and prepare them for lifetimes of learning should be integral to education at all levels.

Virginia, then, is in the midst of profound and often confusing change. In the context of a generally healthy economy and growing population, circumstances call for new approaches from our educational systems and institutions. The schools, colleges, and universities have improved markedly over the past several years, and now they are called to coordinate their activities better, to introduce new perspectives on their curricula, and to become actively involved in a range of state and global problems that will be with us beyond the turn of the century.

THE CASE FOR CHANGE

III. Global Perspectives and Literacies

Daunting though it may appear, making space for more students in Virginia higher education is not the major problem we face. Higher education has absorbed greater surges of new students at least twice in the last 50 years: under the GI Bill after World War II and as the original "baby boom" surged through the educational systems. We saw at those times that change can occur rapidly when higher education perceives that it is in society's and its own interests to change.

The major challenge is the need to develop new and different perspectives from which the curricula of colleges and universities are taught, and new understandings of higher education's responsibility to the state, its citizens, and the nation.

The need for mathematical, scientific, and technological competence in the 21st century is generally accepted. Yet we are far from achieving literacy in these areas and ought to make more forthright efforts in the curriculum to do so. We need citizens who can understand and question science and technology, and who can make informed judgments about them.

We also should have a curriculum that helps students develop competence in public speaking, writing, listening, and seeing the world around them. The curriculum should, in short, attend to all forms of communication in which we regularly engage.

It seems clear to us that our lives are now inextricably related to those of people living in other nations and different cultures. As our nation becomes more racially and ethnically diverse, the difficulty of seeking a common ground among our own citizens is increasingly linked to our efforts to find a common ground among trading partners and political allies around the world. We can understand our economy only in the context of a global economy, just as we can understand our environment only in the context of the global environment.

Political issues at the national, state, and sometimes the local levels now have global dimensions. Our lives have changed in ways that we have not yet fully comprehended. We need to prepare students for a world in which old rules and assumptions no longer apply. For instance, in the year 2000, only 15 percent of the new workers entering the American job force will be Caucasian men. Our children and grandchildren will encounter vastly different workplaces than those to which many of us are accustomed.

The best response from higher education is to offer students an entirely different perspective—a global perspective—on the subjects they choose to study. This goes beyond adding some courses on global issues or starting a few new degree programs. For instance, only two Virginia colleges and universities offer graduate study in foreign

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languages. Only one offers more than an introduction to Japanese or Chinese and no state-supported institution offers Korean language study. Changing this involves a new perspective on language study: not a general education requirement to get out of the way but a prelude to valuable advanced courses.

We should be careful to distinguish among curricula in determining what "global perspective" means. The phrase suggests an attitude, a way of looking at things, rather than merely a new reading list. We think that substantive change will require reconsideration of teaching and learning across the curricula. While this kind of change rarely if ever occurs overnight, it is important that we begin now to talk about how it should occur.

The graduates of Virginia's colleges and universities should know that the cultures to which human beings belong determine in large part the ways in which they perceive the world, the questions they can ask about it, and what and how they know. They should be aware of and, if possible, experience for themselves the diversity and richness of human experience, a diversity rooted in culture but also in gender and race.

Clearly, this requires more than studying geography or a foreign language, although the study of languages is particularly important because they shape and are shaped by the cultures in which they are rooted. It involves more than a semester abroad, although living in another culture is invaluable as a way of learning the richness of human experience. It involves more than a required course or sequence of courses in general education.

The transformation will have to begin with the faculty because we are suggesting that they see the world and the disciplines in which they specialize in different ways. Only when faculty begin to re-think the premises upon which their teaching and research have been based, and are given the time, resources, and rewards to do so, will it be possible to transform the curricula.

Virginians, and indeed all Americans, need to understand other cultures in order to understand their place in the world. But it is, of course, equally important that they understand their own national heritage. We think we are entering into a period in which there will be a constant interchange between global and national forces that are critical to us and that will continue to define who we are.

Knowing ourselves as Americans involves both knowing the history, language, customs, and ideals of the predominant culture and recognizing the racial, ethnic and cultural diversity of the American people. To deal effectively with the rest of the world we shall have to learn to deal effectively with the differences among ourselves. Indeed many cultural identities can become a national identity.

We favor a curriculum that introduces students to American thought in all its complexity. This means helping students to comprehend the ideals of this nation and the many experiences of Americans that run counter to these ideals. We favor a curriculum that helps students develop the skills of analysis and communication that will make it possible for them to understand the overlapping cultures in which they live and also to shape them. By helping Americans become thoughtful creators of culture, higher education serves not only as an agent of continuity but as an agent of change.

We think that what is required is a thorough review of the entire undergraduate curriculum, both general education and the majors, with this question in mind:

> "To what extent does this part of the curriculum help students to comprehend the variety of human cultures and the wide range of human experience that results from it?"

This inquiry will involve consideration by all institutions of ways of teaching, the content and breadth of present courses, and possibly the development of different curricular offerings. Global differences and similarities in the approach to knowledge are significant and worthy of study in the sciences as well as the social sciences and the humanities.

We further recommend that the colleges and universities undertake a broad review of graduate and professional curricula. We realize that study at this level is more specialized but there may nonetheless be places where new global perspectives should be included.

The Commission notes several areas of scholarship that the colleges and universities might draw upon as they seek to reflect greater diversity in their curricula. Research on women and gender and on the African-American experience, in particular, is enriching our understanding of our own and other cultures. Research on non-western cultures is making similar contributions. An exciting project, "Race and Gender: Programs in Faculty and Curricular Development," at Mary Washington College offers a valuable example of how an entire institution is being influenced by such scholarship.

The focus of this report is on undergraduate and graduate education in the liberal arts and sciences. But some of our observations may apply to professional education (law, medicine, dentistry, and veterinary medicine) as well. Time did not permit a thorough scrutiny of these programs but we did receive comments from faculty, administrators, and interested citizens. We recommend that the State Council of Higher Education be directed to conduct separate studies of selected professional degree programs in the Commonwealth.

How they knew what we
Must know
Without knowing a page
Of it
Themselves

— Alice Walker

We are particularly concerned about the future of medical education. Changes in federal health care programs, in medical practice, and in the health needs of the population make future financial support for medical education and the teaching hospitals usually associated with medical schools a potentially critical issue. Medical education ought to be the first professional program the Council studies.

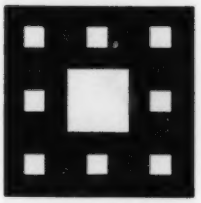
The role of Virginia's traditionally black colleges and universities deserves special mention. The objectives of increasing the black enrollment at the state's and the nation's traditionally white institutions and of strengthening the traditionally black institutions must be pursued equally.

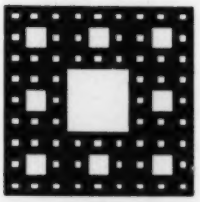
Also important is preservation and development of an African-American tradition that should be recognized as part of our heritage and of our everyday lives. The traditionally black colleges and universities should continue their efforts to attract more white students so they will have opportunities to explore this rich and important part of American culture.

Virginia also should consider ways to ensure that the large number of persons who enroll in two-year or shorter occupational-technical programs leave higher education with a global perspective. Virginia's community colleges enroll about 40 percent of the students in the state-supported institutions. Fewer than one-fourth of these students are enrolled in programs aimed at transfer and further study toward a bachelor's degree. In fact, many community college students do not seek degrees at all.

It will not be easy to impart global perspectives through occupational-technical programs that last two years or less. But the women and men enrolled in these programs may be participating in the final formal educational experiences of their lives. The community colleges owe to them the opportunity to comprehend the cultural complexity of the world in which they will live. They will be better and more productive citizens for the experience.

Finally, undergraduate education, both baccalaureate and occupational-technical, should help women and men become more adaptable to changing circumstances. We shall not rehearse predictions about the number of times people will change jobs and careers, but it is clear that a global, liberal education will stand students in good stead.





THE CASE FOR CHANGE

IV. Technology, Teaching, and Learning

While a great deal has been written during the past few years about the "information age" in which we now are living, there appear to have been few attempts to understand what kinds of changes will occur within colleges and universities as a result of significant advances in computing and communications technology. We have been told only that tomorrow's workforce (and, indeed, today's) will have to be "computer literate" and capable of using sophisticated technology to perform tasks that hitherto have been done either mechanically or not at all.

It clearly is important that our children and theirs be able to work with the most sophisticated technology available to them. Our colleges and universities have a special obligation to ensure that their curricula include instruction in this technology, and Virginia has an obligation to ensure that its system of higher education continues to have access to the equipment needed for excellent instruction, research, and service.

It also is important that our students understand that life in the "information age" involves far more than the convenience of a personal computer in every home, totally portable music systems, and the "call waiting" option on telephones. We have moved from a society and economy in which technology was primarily an extension of human muscle, giving us the strength to manipulate inert materials—a manufacturing and processing society—to one in which technology functions to create information. Biotechnology, management systems, processing and manufacturing systems—all create information from data that heretofore could not be collected, analyzed, or synthesized. The "information age" signifies a new relationship between us and the world in which we live. Comprehending the technology that makes this age possible is important. Comprehending the implications of the changes that have occurred and will occur because of the technology is critical.

Teaching about the technology is the easy task. Learning to ensure that technology is applied wisely is far more difficult. Mastery of technical, professional, and administrative skills is not enough to make life good in the next century. College and university students have to learn how to make technology part of useful lives. The curriculum should explore technology's possibilities and

stress our responsibility to use it well.

The imaginations of those responsible for colleges and universities themselves will be tested by the ways in which the power of advanced technology is incorporated into teaching and learning within the institutions. Used properly, it can improve the quality of instruction and increase the personal contact between faculty and students. Used improperly, it will contribute to the depersonalization of higher education that has been decried at least since jokes about students being treated like punched cards in a computer system ("please don't fold, spindle, or mutilate me!") began making the rounds.

One excellent document about the use of technology in higher education is the "Report of the University Task Force on the Impact of Digital Technology on the Classroom Environment," presented early in 1989 to the community of Virginia Polytechnic Institute and State University. The Commission draws heavily upon it in discussing the subject.

The constraints of space and time will be reduced by thoughtful introduction of telecommunications and computers into the instructional mission of colleges and universities. For centuries, students have earned academic credit for hours spent in contact with an instructor. It was, therefore, essential that they be in the same place at the same time. The Virginia Tech report finds that new digital technology offers the promise of three significant changes in student-faculty contact:

> "(1) The nature of formally structured contact will shift.
>
> (2) A larger part of faculty/student contact will be *ad hoc* and relatively unstructured.
>
> (3) The provision of an electronic message system will allow extensive contact without requiring student and teacher to be in the same place."

These changes, the Tech report goes on, will be positive only if the amount of faculty contact with students outside the formal classroom increases as classroom contact itself decreases. But this will require different architectural conceptions that offer faculty and students informal gathering places. The distinctions among classroom and laboratory buildings, libraries, student centers, residence halls, and faculty offices become much less clear than they are today. The new technologies suggest the following types of changes in academic life.

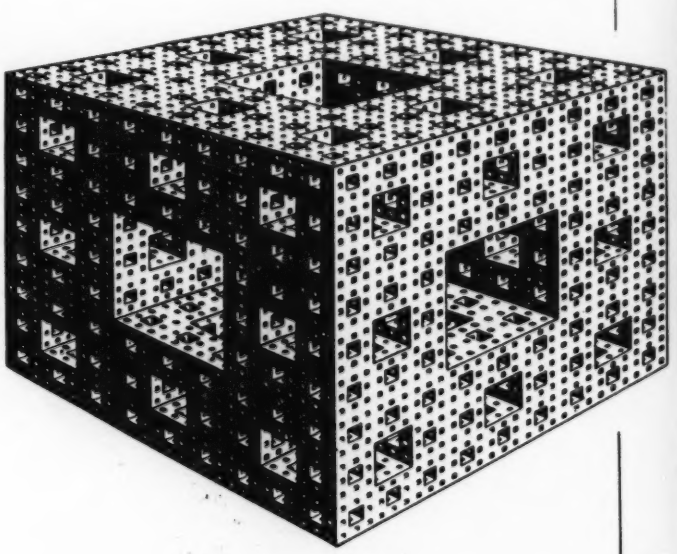
- Students will be attending televised lectures in their residence halls and drawing materials from the library using the computers in their rooms. Future residence halls should be viewed as at least partly instructional space, and students should be encouraged to be actively involved with one another in their own learning. This has implications for how residence hall construction is financed.
- Faculty will be meeting students informally and doing much of their non-laboratory research in their offices. The size of offices may have to be larger.
- Some instruction will be conducted electronically and some will occur in small informal meetings between faculty and students. The amount of standard classroom space probably can be decreased.
- The advent of advanced technology will enable colleges and universities to integrate many aspects of college life, rather than segregating them into separate buildings. Space for student activities, for instance, can be combined with other kinds of space. (This, too, implies different approaches to financing construction). George Mason University, for instance, is proposing to wrap its new student center around the library.
- Non-residential and commuting students will also be able to attend lectures in convenient locations or at home as well as have access to libraries electronically from multiple locations. Off-campus uses of space and faculty time to accommodate these students as flexibly as possible should be designed.
- Electronic access to library catalogues will eliminate the need for some reference space in libraries but probably will increase the need for computer space. Conversion of large volumes of statistical and other material to electronic media will reduce the need for storage space as the library becomes more an information center and less a warehouse.

We need to reconceive the role of the library as the heart of an academic institution. Our discussions have led us to think that the library of the future will be more than a repository of books, papers, records, and other print material. Primarily it will be a critical node in an information network: a source of information and of help in determining what information is available and how to gain access to it. The role of the reference librarian will be expanded greatly as the range of accessible materials increases.

Again, we have not developed a detailed plan for the academic libraries of Virginia. Much of what is being done in the system of higher education seems to be directed toward the right objectives. We recommend that a detailed plan be developed that includes these elements:

- creation of fully electronic and compatible catalogues of the holdings of every academic library in the state
- creation of a telecommunications network by means of which users can search for materials in every academic library in the state and can have some materials transmitted to them
- linkage of the Virginia library network to all major national and other state networks

Our existing theories work well, which is certainly a reason to be happy; but we should also be sad because the fact that they work so well is now revealed as very little assurance that any future theory will look at all like them.
—Steven Weinberg



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We must be clear that, when it comes to atoms, language can be used only as in poetry. The poet, too, is not nearly so concerned with describing facts as with creating images.
— Neils Bohr

No, I never was lost. But I once was bewildered for three days.
— attributed to Daniel Boone

- reduction of printed materials, where feasible, legally permissible, and appropriate, to electronic media to reduce storage requirements and permit rapid electronic transmission
- concentration of little-used materials in high-density storage facilities
- preservation of historically important documents and texts
- emphasis on library services provided by information specialists.

Making the kinds of change envisioned will require access to sophisticated equipment and assurance that equipment can be replaced on a regular schedule. The Higher Education Equipment Trust Fund, a debt-financed program that has provided $85 million for instructional and research equipment, was created with great foresight and imagination by the Governor and General Assembly in 1986. It continues to have the potential to meet many technological needs of Virginia higher education. It is unique in the nation and has placed Virginia's colleges and universities among only a few in the nation for whom access to instructional and research equipment is not a major problem. If it continues to be supported and employs the most advantageous financing vehicles available, it will help the colleges and universities and their students immeasurably over the next decade or more.

The need for a long-range vision is nowhere so acute as in space planning. Buildings being planned today and constructed in the early 1990's will be used until 2030 or beyond. Campus planners should envision the electronic opportunities that will be available in the coming decades and the changes in teaching and learning that will occur. They and state officials should be open to new partnerships between higher education and private enterprise: common research facilities, electronic classrooms in offices and plants, privately-financed construction of university facilities on state property, to name a few possibilities.

Colleges and universities will also need different kinds of space as the characteristics of their students and staff change. Child care facilities, for instance, are important to married students and workers, and particularly to single parents. Providing convenient space for this service will help to make institutions accessible to much of the population.

But constructing the right physical plant is only part of the challenge. The reward systems that guide behavior of faculty and administrators will have to change as well. Colleges and universities typically do not have ways of counting informal contact between faculty and students—contact apart from the "credit-for-contact" time spent in classrooms and laboratories—in making promotion, tenure, salary, and other decisions that reward faculty for work well done. Yet the Virginia Tech report suggests that this informal contact will increase as the faculty-student relationship changes.

In much of American higher education, extensive personal contact between students and faculty is rare. This is especially true in the most popular academic programs and at the freshman and sophomore level. The Virginia Tech report cautions against allowing the new technology to "exacerbate this already serious problem. If we are to see less of our students in the classroom, it becomes important that we see more of them outside it. Such interaction, however, requires both location and motivation, and both are in short supply."

The locations can be provided by building different kinds of space. The motivation comes from the incentive system. Faculty will need released time to develop courses appropriate to electronic delivery. Students will not be well served if the existing courses are simply converted to a new medium. Courses transmitted electronically need not be bound by the traditional academic calendar or by the normal workday, once they have been freed from the standard "credit for contact" mode.

Faculties will have to design new ways to recognize and reward high quality teaching, both in the formal classroom and in unstructured settings. "Perhaps the one essential mission of higher education," the Virginia Tech report states, "one that could be accomplished by no other institution in our society, is that of advanced teaching and learning. Because of this unique mission, colleges and universities must ensure that faculty are recognized and rewarded for quality teaching as well as provided opportunities for improving their teaching."

Our public hearings, reading, and personal experiences convince us that advising students is one of the most neglected aspects of academic life. If the advent of technology implies that advising and informal contact with students become much more important faculty responsibilities, the faculty will have to learn to do them well. We cannot assume that they are easy tasks or naturally performed. No one has difficulty comprehending the need to re-train the workers in an assembly plant when it is automated. We need also to understand that faculty, whose responsibilities are so much more complex and so important, must learn new skills as their workplaces are changed by new technology.

The types of people employed in colleges and universities to offer instruction, the terms and conditions of their employment, and the systems by which they are rewarded for their performance, all will have to change as computer and telecommunications technology permeates higher education. As they propose to install sophisticated technology that will change the nature of teaching and learning, Virginia's colleges and universities should be required to demonstrate that the rewards for faculty encourage good advising and informal contact with students. These activities should become a more important part of collegiate life.

It is not possible to provide an education for the 21st century without the new technology, and the state has an interest in ensuring that it is used well. Planning, funding, and institutional mission decisions should support and encourage adoption of the technology. Assessments of student learning conducted by each college and university should seek to determine the strengths and weaknesses of the technology and the ways it is used.

THE CASE FOR CHANGE

V. The Faculty

The aging of the faculty is a matter of grave and immediate concern, even though the effect will not be felt for ten to 20 years from now. There is no mandatory retirement age in Virginia, and the largest number of faculty are now between ages 45 and 55, with about one-fifth over age 55. Very sketchy Virginia data indicate that few faculty will opt to continue working beyond the age of 70, even when there is no mandatory retirement age. These data mirror the little national data of which we are aware. We can estimate, therefore, that in the decade from 2000 to 2010 more than half the faculty in Virginia probably will retire. But economic conditions could change the behavior of older faculty, and the state ought to plan ways to take advantage of their talents under any conditions.

There will not be a sufficient number of high-quality faculty available to replace those retiring and to respond to the enrollment growth that is coming. An analysis of national trends in the academic labor market suggests that from 1997-2007 there will be a supply of approximately 62,000 potential new faculty and a demand ranging from 75,000 to 80,000 vacant positions. Clearly this will be an extraordinarily difficult market in which to recruit outstanding candidates. We also know that there will not be sufficient numbers of blacks and women in Virginia's faculties unless something is done to change current trends. (In 1988-89 only six percent of the instructional faculty at public institutions were black and 28 percent were women.) We are, moreover, concerned that departmental structures which support the disciplines may sharply limit higher education's flexibility in a time of rapid and dislocating change.

The potential shortage of highly qualified faculty cannot be dealt with by one state's system of colleges and universities. Nonetheless, there are some actions Virginia can take.

- Virginia should help the major doctoral degree-granting institutions support adequate numbers of the best possible graduate students in the sciences, the arts and letters, and the social sciences. Graduate students in disciplines whose research is sponsored sometimes can receive stipends as part of the research project funding. But those in other disciplines will need graduate fellowships in order to survive on the way to their doctorates. We think that additional financial support for students pursuing doctoral degrees is an investment that is well worth making.

For their part, the doctoral degree-granting institutions should review their graduate programs carefully to ensure that students can earn doctoral degrees in the shortest possible time. The time required to earn a doctoral degree has increased steadily over the past two decades. In 1967, the average time to earn the degree was 5.4 years. By 1987, it was 6.9.

The doctoral degree-granting institutions also should seek to ensure that graduate students are learning to be good teachers and good faculty members. Preparing graduate teaching assistants for their responsibilities is an obvious place to start. Seminars bringing together experienced faculty and graduate students to discuss teaching and the roles of faculty also might help. Discussion of faculty participation in institutional governance is particularly important.

- The nation's scientific and engineering work force is threatened by retirements and dwindling student interest. This is occurring at a time when 85 percent of new entrants to the labor force between now and 2000 will be minority group members and women—groups historically underrepresented in science and engineering. The opportunity presented by this situation to increase the numbers of women and minorities in science and engineering is unprecedented.

Virginia should invite the states that produce the largest numbers of potential faculty (those with the major doctoral degree programs) to join with it in a multi-state compact to increase the numbers of blacks and women receiving doctoral degrees in the sciences, social sciences, and humanities. Rather than each attempting to go it alone, participating states could contribute funds to a centrally administered fellowship pool that would solicit applications throughout the nation. Additional support could be sought from major foundations. Students would follow normal admissions procedures and take their fellowships to the institutions (state-supported or independent) of their choice.

We think it likely that a concerted effort would reach more students and attract more non-state support than individual efforts of the states. This is a national problem, not simply Virginia's. An organization like the National Governor's Association might take the lead in developing the compact.

- Virginia's colleges and universities should look to hire new faculty from a pool of women and men who took their doctoral degrees during the past ten to 15 years when there were few faculty jobs available. Many of these persons sought other careers but remain qualified to teach in the nation's colleges and universities. Indeed, the University of Virginia has run a summer program for several years to help doctoral degree recipients prepare for work outside the academy. It may now be time to invite some of them back inside, if they wish to come.

The response is liable to be limited. Many persons, having begun other careers, may not be willing to start on the problematic pursuit of tenure. Many will not have remained current in their academic fields and will not be able to pick up where they left off. Those who choose to return may need help: seminars covering new developments in their disciplines, mentors from among the senior faculty, initially reduced teaching loads.

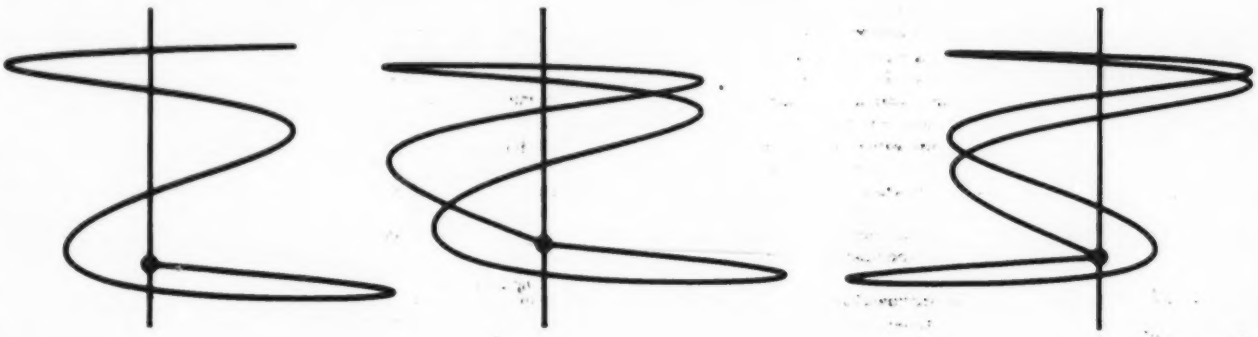
- Virginia should begin a hiring program by 1992-94 to bring young faculty into the state's colleges and universities. Their presence will be premature as a response to enrollment growth, but not in response to the kinds of curricular

Any good teacher faces a central dilemma: he or she must pass on a base of knowledge, while simultaneously communicating the idea that knowledge itself is emergent, uncertain, and subject to revision.

—Ursula Wagner

It is the theory that decides what we can observe.

—Albert Einstein



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VI. The Values of Research

[T]he years of anxious searching in the dark, with their intense longing, their alternations of confidence and exhaustion, and the final emergence into the light—only those who have experienced it can understand it.

— Albert Einstein

change needed. Most important, hiring them in 1992-94 will give Virginia an advantage. Such a program is a way to get the best faculties in place now before recruiting starts in earnest later in the 1990's.

Institutions might ask senior faculty beyond age 70 to become mentors to junior faculty who are beginning their careers in Virginia colleges and universities. Senior faculty also could become mentors to graduate students in the doctoral-degree granting institutions.

- Finally, the need for a new generation of well-educated faculty is national and adequate financial support for graduate students ought to be a federal priority. Virginia and the other states should encourage the federal government to support graduate student assistance and we urge the Governor and General Assembly to communicate this need to Virginia's Congressional delegation.

As global dimensions are added to the curricula, as telecommunications-based instruction becomes more widely used, as increasingly sophisticated student advising evolves, and as other changes occur that we have neither the wisdom nor the information to predict, Virginia's faculties will need more opportunities for professional renewal and development than are now available. In part, this need can be met by individual institutions if they have funding for it—and this should be a priority item in the next decade—but Virginia also should consider creating several Faculty Teaching Centers within the system of higher education. Stated broadly, their mission would be to help faculty renew themselves as teachers: to learn new techniques, improve advising skills, master new forms of instruction (such as the use of television), design new courses, take seminars on new developments in their fields, and so on. They need not follow a single model and could be established on the basis of competitive proposals from the institutions.

Individual institutions and groups of institutions should begin faculty seminars as part of the regular activities of the academic year. Faculty could be invited to work together on specific topics, with their work stimulated by guest lecturers and consultants. These seminars—along with leaves, released time, and Faculty Teaching Centers—would help faculty prepare themselves to meet the challenges of sweeping curriculum change.

Research and scholarship in the service of Virginia, the nation, and the peoples of the world clearly are important responsibilities of the state's colleges and universities. One of the most important contributions higher education makes to the states is research and scholarship that promote economic development: ideas, new industries, processes, and products that add jobs and wealth to the state's economy.

The mission of the modern research university includes a number of activities that compete for limited resources. While this adds to the complexity of American higher education, we think it is important that research in a democratic society be conducted in institutions committed to unfettered inquiry and academic freedom.

We are impressed by the progress Virginia is making as three of its universities move upward in the ranks of the nation's top 100 research institutions in terms of sponsored research volume and as several others build noteworthy strength in various fields of research. The quality and range of Virginia's growing research ventures are noteworthy as well. We think that this growth should be encouraged, and that the research conducted in Virginia's colleges and universities drives its economic development. At the same time, we note that Virginia has the 11th largest system of higher education in the nation but its universities rank only 20th in total volume of sponsored research. The state should do what it can to encourage an increase in the amount of high calibre scholarship and research performed by the faculties of the colleges and universities.

It is important to recognize that some kinds of scholarship and research are better supported financially by sources outside the university than others. For example, there is less money for research into public policy issues than there is for adhesives and composites, and there is still less for research in literature. Sponsored research tends to generate answers to the questions in which its sponsors are interested.

Published research in many disciplines usually is not sponsored, even though it creates new knowledge that helps to shape the disciplines. Much of the research in the humanities, the arts, and the social sciences is not sponsored externally.

Virginia's emphasis on the importance of research in its system of higher education ought to recognize both that which is sponsored and that which is not. Ranking institutions by sponsored research volume distorts the notion of scholarship and provides an incentive to emphasize some disciplines at the expense of others. For our long-range good, we ought to think of research in all the disciplines as an activity that warrants society's support.

All scholarly inquiry, whether sponsored by external sources or not, is central to higher education's role as a primary creator of new knowledge. Virginia should encourage scholarship and research in all fields in which its universities have faculty strength. This will help to ensure that the institutions do not become skewed in one direction or another by the external support they receive for some kinds of research.

At the same time, we recognize that research sponsored by federal agencies and industry generates jobs and wealth in Virginia, as witnessed by the fact that the University of Virginia has been able to construct almost $30 million worth of research space from sponsored research overhead in the last decade. This research is particularly important, and we offer several recommendations, again without having developed a detailed plan.

- Because sponsored research often requires additional support for space, equipment, and staff to accommodate the projects undertaken, Virginia should support externally sponsored research based on the amount the institutions generate from external sources.
- When institutions increase their externally sponsored, peer-reviewed research volume above that of a base year, the state should reward them, primarily by providing additional laboratory space, supporting graduate assistants and post-doctoral students, and continuing to return the state's share of overhead revenues when institutions increase their externally-sponsored, peer-reviewed research volume above that of a base year.
- The cost of research and the complexities of evaluating proposed research make the role of the state necessarily catalytic and supplemental, rather than the primary source of funding. Virginia should help institutions increase the amounts of sponsored research funding they receive from federal agencies or industry. The incentives suggested

above will help, as will matching grants through the Center for Innovative Technology. Continued support for Commonwealth Centers, identified by national peer review as activities that are among the three or four best of their kind in the United States, further adds to research strength.

While acknowledging the great importance of research in Virginia's colleges and universities and the desirability of increasing the amount done, the Commission urges that the relationships between graduate and undergraduate instruction and research be explored.

Research can overshadow teaching, often to the detriment of undergraduate education. In particular, the Commission is concerned that undergraduates may be taught by graduate students who are not prepared to teach, and that the need to support themselves by teaching extends the amount of time graduate students take to complete their doctoral work.

We are persuaded that serious and continuous intellectual activity by members of the faculty—although not necessarily in all fields the basic research that creates new knowledge—is a prerequisite of good teaching. But we do not believe it to be self-evident that good research and scholarship lead necessarily to good teaching, either of undergraduates or of graduate students.

None of the concerns we have raised should obscure the basic point we wish to make: the capacity of Virginia's colleges and universities to conduct research and scholarship will help the state develop economically, and can help the institutions become better places to teach and learn. Work being done at Virginia Tech on composite materials and new adhesives, for instance, brought the university over $10 million in research awards last year. Numerous Virginia companies have been assisted by a program of the Center for Innovative Technology that put them in contact with scientists who helped them solve technical problems. Research deserves greater emphasis and support, even as the colleges and universities examine the relationships between research and graduate and undergraduate education.

[The] new Philosophy calls all in doubt,
The Element of fire is quite put out;
The Sun is lost, and th' earth, and no mans wit
Can well direct him where to look for it

—John Donne

So the sun Sits as upon a royal throne ruling his children the planets which circle round him.

—Copernicus

People gave ear to an upstart astrologer who strove to prove that the earth revolves, not the heavens or the firmament, the sun and the moon.

—Martin Luther

THE CASE FOR CHANGE

VII. The University In Society

The university in the 21st century cannot perceive itself as responding to the needs of the marketplace. Rather, we think that this will be a time when higher education should be prepared to provide strong leadership to our society. We really do not know where we are going in the exciting decades ahead of us and the university that simply signs on for the ride will be defaulting in its critical role. The old descriptions of the university—"in but not of" the society; the "friendly critic" of the society within which and by whose tolerance it exists—are necessary, but not sufficient to the kinds of change that are occurring.

Some boundaries, like those between higher education and industry, are breaking down. Others, like those between elementary-secondary schooling and higher education, should break down. The colleges and universities of the 21st century should look forward to much more complex relationships with other social institutions.

We think that colleges and universities should become more involved in the pressing issues of the day. We are concerned that higher education could become merely a support service for industry, economic development, or government. But it is better that the university be engaged than disengaged, better to risk involvement than irrelevance.

The women and men who work in colleges and universities are not uniquely qualified to solve the major social problems of our time. But they do bring to such problems a vast array of knowledge and analytic and technical skills that few others command. They come, moreover, from institutions in which free and ordered competition among ideas is especially valued. Their detachment, and that of the colleges and universities in which they work, assures that problems are looked at from different perspectives.

Because colleges and universities provide opportunities for students to develop values and learn from role models, it is extremely important that they deal with faculty, staff, and students without regard to sex, race, or ethnic origin. It is particularly important that women and minorities hold faculty and administrative positions approximating those of the larger population and that they be rewarded equitably. We realize that this is not an easy goal to achieve, but we urge the strongest possible commitment to doing so. This is not an ancillary social responsibility of higher education, but a curricular matter, a matter of what and how students learn.

The kinds of higher education we shall need depend upon the kind of human beings we want our children and their children to be. We think they should be analytically skilled but gen-

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And what
if the universe
is not about
us? Then what?
What
is it about
And what
about
us?
— Max Swensen

erous thinkers, skeptical but idealistic, committed to teamwork and the common good, possessing technical, professional, or administrative skills, but also broader perspectives on their lives, deeply involved in the institutions of their own culture but also enriched by the endless variety of human culture and experience among the peoples of the world, aware of interrelationships of states, nations, and economies, and able to deal effectively with conflicting ideologies and values. All of this may sound naive or impossible, or both, but we think it is important that our children and their children have opportunities to become better citizens, parents, workers, and companions.

These same characteristics ought to be affirmed by those who teach in and govern our institutions of learning. They should be conveyed to students not only in what is taught but in the behavior manifested within the school, college or university itself. Students learn at least as much from the behavior they observe around them as from their formal lessons, and they often experience a curriculum that is different from the one the faculty thinks it is teaching. Their experiences of the formal curriculum and the settings in which they learn, play, and work need to be better integrated.

High intelligence without a high sense of value and integrity is not only less than useful to the country; but also dangerous.
— The Rev. Theodore M. Hesburgh, C.S.C.

A well-ordered humanism does not begin with itself; but puts things back in their place. It puts the world before life, life before man, and the respect of others before love of self.
— Claude Lévi-Strauss

Many issues affecting America's colleges and universities today reflect implicit and explicit choices made in the larger society. We have not discussed a number of these issues that are major concerns. One of them is intercollegiate athletics. We are encouraged by the sound perspectives of several Virginia colleges and universities on the role of inter-collegiate athletics, the priority they put upon helping student-athletes receive their degrees, and the recognition that institutions of higher education are primarily places of learning. As a first step, we urge all Virginia colleges and universities to publish the graduation rates of athletes. This may be the best indicator readily available of the extent to which institutions educate their student-athletes without exploiting them.

It is increasingly apparent that students learn from other students, perhaps as much as they learn from the formal curriculum. The students who attend Virginia's institutions contribute greatly to their diversity and to the richness of the educational experiences of all. In a great nation with a mobile population, the notion of distinguishing between residents of Virginia and other states is in some ways anachronistic. At a time when the political and economic barriers among nations are being lowered, higher education in the next century will be poorly served by barriers among states.

The continental nations of the European Economic Community recently took action to make their universities accessible to students from all member nations. In doing so, the president of the University of Bologna remarked, they had made higher education in Europe as accessible as it was 500 years ago.

But within the United States problems abound: unequal quality of institutions and investment in them among the states, great disparity in tuition policy, variations in population forecasts, and others. We think the practice of classifying students as in-state and out-of-state will eventually end, but we do not yet perceive the administrative mechanism that will replace it. Interstate compacts like the Southern Regional Education Board have for some time been helping member states share programs so they can cope with varying student and employer demands and limited resources. These arrangements may someday evolve into the mechanism that we are seeking. Until such a mechanism is available, Virginia should recover in tuition and fees as much of its cost of educating out-of-state students as it can and remain competitive. Its institutions could use some or all of the revenue generated in this way to provide additional financial aid to needy students.

Limiting out-of-state students is not consistent with Virginia's leadership aspirations. Broad accessibility to a range of students is particularly important, for instance, in recruiting faculty to the Commonwealth's colleges and universities. Thus we strongly endorse the current Virginia practice of permitting its colleges and universities to accept substantial numbers of students from other states. Indeed, we encourage the institutions to diversify their student populations even more, including students from states that are not geographically close to Virginia and from other nations. We are not arguing for greater proportions of out-of-state students but for more diversity within the present enrollments. Virginia will be a stronger state in the future if its institutions are permitted to remain open to out-of-state students.

In making this recommendation, we are following the lead of the Higher Education Study Commission that in 1965 recommended many of the changes that have brought Virginia higher education to its strong position today. That Commission endorsed practices in place at the time and recommended that "no arbitrary limitations be imposed on the number or percentage of students to be admitted from other States or foreign countries in the state-controlled institutions of Virginia." We think this is a wise policy that Virginia should continue as it shapes the future of its colleges and universities.

VIII. The Academic Organization

The "tyranny of the disciplines" in American higher education is an extremely perplexing problem. We understand this phrase to mean that the academic disciplines and departments that support them define acceptable methods of inquiry and what it means "to know" something about ourselves and about the world. Discipline-based departments set the criteria by which research, scholarship, and teaching are evaluated and, as a result, how rewards are meted out to faculty members (promotion, tenure, salary increases, teaching schedules, research space, and so on). Membership in a discipline and the corresponding department, rather than in a particular college or university community, is the basis for many faculty members' professional lives.

We think that this disciplinary-based system must change. The president of one Virginia university has observed that the fact that much exciting teaching and research is called "interdisciplinary" is really a mark of shame: the present disciplines are no longer adequate to what we know and the problems we must solve. Nevertheless, they exert too much control in our colleges and universities. As a result, the rewards for working outside the established boundaries of the disciplines are limited. For junior faculty, unprotected by tenure, the sanctions often are fatal.

The culture of higher education is broader and stronger than the colleges and universities of Virginia, which cannot change the disciplines by themselves. But Virginia's institutions might be able to ensure that faculty are rewarded differently: that the quality of teaching really does affect tenure decisions; that interdisciplinary research and teaching are recognized and valued, at least in this state, with the coins of the realm; and that the hierarchical systems of faculty rank protect but do not limit free inquiry.

We are aware that Virginia's senior institutions and Richard Bland College have traditional tenure systems while the Virginia Community College System has a system of continuing contracts. We offer no specific recommendations about these systems in themselves, but observe that tenure today may serve more as a personnel management system than as protection for free inquiry. While freedom of inquiry must be encouraged at all costs, we think it is important to be willing to consider changes in the administrative policies and practices of higher education as the responsibilities of faculty evolve.

We suggest that institutions include in their procedures regularly scheduled performance reviews of all faculty and administrators, regardless of tenure or contract status. We further suggest that institutions review their procedures for awarding salary increases to ensure that genuine merit in a range of responsibilities, including teaching, advising, scholarship, and public service, receives due consideration.

We also suggest that Virginia's colleges and universities consider alterations to an even broader range of practices. Our educational systems and institutions reflect constraints of time and space that, in light of new technologies, may be more imagined than real. Universities and colleges are conceived as assemblages of buildings within which courses are offered at scheduled hours and within which libraries of information are available for access. We and our children "go to college." Accreditation is organized around the "site visit."

We have rarely questioned the adequacy of the nine-month academic calendar, an anachronism that reflects the needs of an agrarian society for labor in the fields during the summer growing season. Neither have we questioned the practice of scheduling classes mostly in the mornings, nor the use of the credit hour, which is a vestige of early production theory.

Some of this is changing—in fact, already has changed. Telephone lines have eliminated space as a barrier to communication. The answering machine and electronic mail have begun to eliminate time as a barrier.

The college or university of the 21st century is a network of resources linked together electronically or physically. The resources are teachers, students, information, and equipment. A good physical plant is important, but there is more to a college or university than its buildings.

More energy should be directed at developing communications networks to link dispersed resources. The need to concentrate research (the Research Triangle, Route 128, Silicon Valley) and instruction has diminished with the advent of high-speed telecommunications. Scientists at Virginia Tech manipulate robots at distant NASA laboratories, just as NASA scientists manipulated the space probe around Neptune, over one billion miles from earth. States that spread their research and instructional capacities broadly will be better suited to capitalize on economic development opportunities because of the continuing technical advances in telecommunications.

At the same time, the values of personal contact and reasonable concentrations of instruction and research must not be overlooked. There are some kinds of teaching that can best be done with close personal contact between teachers and their students. There are advantages to being able to leave a physics laboratory and walk across the street to talk with chemists about a particularly puzzling problem. But greater dispersion of research and instructional capacity is now both desirable and necessary for the good of the entire state.

We think the state ought to begin planning to do electronically those things that can be done as well and more economically that way, in order to have the resources to ensure personal contact where it is necessary for high-quality instruction and research. This will require possibly difficult choices. One way to create positions for the technicians who will be needed to operate telecommunications networks and to increase the number of teachers and researchers is to reduce the number of non-teaching staff in some areas. The state's revenues are limited, and trade-offs of this sort may be necessary.

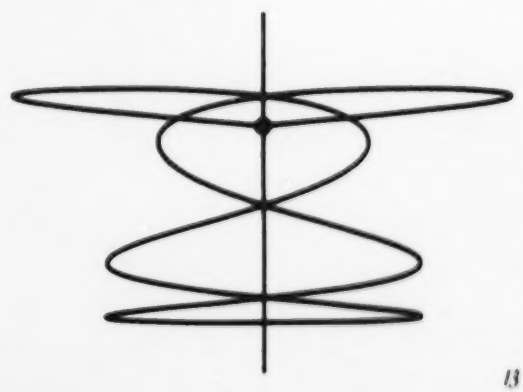
Policies, procedures, and mandates originating in Richmond influence how Virginia's colleges and universities conduct their business. The Council of Higher Education and the central agencies of state government should change the way they do business and the way they build higher education budgets. Decentralized, autonomous operations with post-audit accountability, exception reporting, and a clear set of expectations, rewards, and penalties will put administration of higher education firmly in the control of those employed to do it: the presidents and their senior staffs.

Most professors teach most of the time, and large proportions of them teach all the time, but teaching is not the activity most rewarded by the academic profession.

— Burton Clark

No one ought to approach an education or a university in a spirit that is settled or unquestioning or smug or certain of answers or results.

— A. Bartlett Giamatti



IX. Autonomy, Diversity, and Cooperation

The Commission agrees with numerous persons who appeared before it in public hearings to urge that the hallmarks of Virginia higher education—autonomy and diversity—be maintained in the future. While we recognize that there are other ways to organize higher education, we believe that in the long run the strongest institutions are those that enjoy considerable autonomy. This places great responsibility upon governing boards and presidents, who must demonstrate creativity and willingness to take risks, or the system will stagnate.

The formal system of higher education in Virginia includes a great array of institutions: state-supported and independent, two-year and senior, research and highly specialized, traditionally black and single-sex. Opportunities for fundamental change are open to all. But the sea change being felt in Virginia affects the entire system, and we think that Virginia should encourage creativity and discourage complacency by its method of governing higher education and by financial and other rewards.

Institutions that innovate and demonstrate efficient use of the resources available to them should be freed from state regulation to the extent possible. We applaud the current decentralization program to reward institutions in this way and urge that it be extended.

Less of each institution's appropriation should be based upon its size and more based upon the quality of the services it provides to the Commonwealth. Although some special initiatives were funded in the 1989-90 budget, the current operating budget guidelines still provide faculty, administrative, and support positions based upon institutional enrollment. This offers some institutions an almost irresistible temptation to increase enrollments in order to increase funding. It seriously disadvantages those institutions whose governing boards have determined that they ought not grow for qualitative reasons.

The major incentive for change within Virginia higher education is money. The rewards and penalties for certain actions are generally monetary and these have to be changed if there is going to be any substantive change in the behavior of colleges and universities.

The entire budgeting procedure need not be changed. Changing the base funding probably is not possible anyway, as proponents of program budgeting have discovered. The base is a given, with relatively minor adjustments, unless and until the Governor and General Assembly decide simply to cease providing a certain service to the citizens of the state. So instead Virginia should focus on the incremental funding available to higher education in each budget, and devise a way to use that money to leverage the greatest possible change in the directions suggested in this report.[1]

Several approaches are possible. The simplest is for the Governor to request proposals for specific initiatives as the biennial budget is prepared. The Council of Higher Education could evaluate the proposals submitted by the colleges and universities and make recommendations to the Governor and the General Assembly.

A preferable approach may be for the Council of Higher Education to establish a grants committee to evaluate institutional proposals and recommend the allocation of funds. The committee might be composed of senior faculty members representing each senior college and university and the community colleges. Whether they were elected or appointed could be determined by the Council in consultation with the institutions.

A grants committee could make its recommendations to the Council as the Governor prepares the budget. Or the General Assembly could appropriate the incremental funds to the Council, which could allocate them based upon the grants committee's recommendations.

We realize that our proposal is a striking departure from the current system. But we think that the current system, for all its virtues, does not provide sufficient incentives to encourage substantive changes in curricula or management practices.

We further suggest that the Council be directed, again in cooperation with the institutions, to develop new guidelines for space planning. The new guidelines should take into account the changes in teaching and learning, library material storage and management, telecommunications, and administrative systems that we have identified. They should place less emphasis upon enrollment growth and more upon innovative use of the new technology that is becoming available to colleges and universities. They should reward use of facilities at times when they typically are little-used in residential institutions: in the afternoons and evenings, on weekends, and during the summer. They should reward facilities-sharing, not only within higher education but with other educational systems, businesses, and agencies of government. They should encourage institutions to use alternative forms of capital financing, such as those now being studied by a legislative commission.

We are also concerned about the cost of higher education to students and their families and offer several observations and suggestions on this highly important issue.

- Virginia was one of the first states to adopt a budgeting procedure that indexed the tuition and fee revenues an institution must raise to the amount of general fund revenue appropriated to it. Half the Southern Regional Education Board states now use some form of indexing.

  In the Virginia system, the more money appropriated to higher education from the general fund, the more must be raised from tuition and fees. Higher costs to students and their families are a sign of strong support from state government rather than the opposite and they represent the Commonwealth's commitment to quality. We are pleased that tuition in the community colleges remains relatively low, and urge that this practice be continued.
- The great progress of Virginia's colleges and universities has been achieved with operating budgets whose revenues include an average of about 35 percent from tuition and fees in the senior institutions and about 20 percent in the community colleges. A reduction in cost to students and their families would require hundreds of millions of additional general fund dollars if the institutions were to continue operating at their present levels of service.

  Efficiencies are possible, some amenities can be eliminated or made optional, and some services can be

or all of us, grave or light, get our thoughts entangled in our metaphors, and act fatally on the strength of them.

—George Eliot

[1] (The definitions of "base" and "incremental funds" are obviously crucial here. We mean to include in the base for a two-year budget the operating budget support in the second year of the previous biennium, adjusted downward (but not upward) for enrollment fluctuations. To that amount should be added salary increases for faculty and other staff, and any state-wide increases for inflation.
The incremental funds, then, are everything else that is now appropriated to the colleges and universities: funds for enrollment growth, new activities, or continuation of activities that are not part of the base.)

provided for a fee as they are needed. Student fees for ancillary and auxiliary activities not directly related to instruction make up a sizable part of the total cost of college to students and their families. These fees should receive at least as much attention as tuition in the state's effort to control costs.

- Application and admission data do not indicate that potential students are being excluded by high costs. Nonetheless, we recommend that the Council of Higher Education be directed to undertake a comprehensive study of student characteristics, including financial resources, across the entire system of higher education, public and private. To our knowledge, there is not enough information available about who goes to college, where, and why, for anyone to make a good public policy decision about costs to students and their families.

Institutional diversity and autonomy are extremely important to Virginia higher education, but some decisions affecting the entire system must be made, especially in a period of rapid and fundamental change. For instance, Virginia's system, as we understand it, should not be distorted by permitting massive universities to develop within it. Someone must control enrollment growth, just as someone must seek to ensure that the resources available to higher education are allocated equitably and for the greatest possible good. There must be someone with the responsibility of making decisions for the good of the entire system, rather than on behalf of individual institutions. We think that role is best played by the State Council of Higher Education for Virginia as a coordinating agency for the system, subject, of course, to the oversight of the General Assembly.

The independent and state-supported institutions are not in conflict, as they are in some other states, but there could be more active cooperation between them. Several joint projects between independent and state-supported institutions are underway, and we recommend that the Council of Higher Education make a greater effort to bring the two sectors together.

The same is true of relationships between the community colleges and senior institutions. Again, there are some very good joint projects and active relationships between individual institutions. But more should be done to link the sectors of the system together. Most importantly, it should be made as easy as possible for graduates of community colleges to transfer to senior institutions and get full credit for the work they have done. We know this is not a simple issue, but the colleges and universities should deal with the complexities to make it simple for the student.

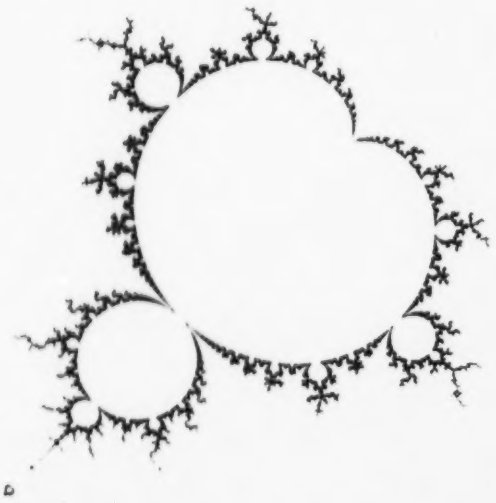
College and university education builds upon the work done in the elementary and secondary schools. There ought to be a seamless web of relationships connecting elementary, secondary and higher education, and a fundamental integrity to the entire system of education. It follows from this that the new perspectives on the curricula of colleges and universities must be reflected in the curricula of the elementary and secondary schools. Otherwise, we shall subject students to education in two systems that are not complementary.

It also follows that higher education's role in the education of teachers is central to the entire academic enterprise. More well-prepared teachers must be available to teach greater numbers of students entering elementary and secondary schools. We think that the president of each college and university that prepares teachers for the state's schools should be personally involved in the activity. Meetings with school superintendents and with faculty primarily responsible for teaching and advising prospective teachers should occur on a regular schedule.

The State Board of Education and the Council of Higher Education have a good record of working together over the years. They have encouraged greater cooperation between elementary-secondary and higher education, but they do not appear to have joined together to request funding for special initiatives that are based upon cooperation. Joint Board-Council grants to ensure continuity of curricula from secondary school to college, for instance, would help to increase communication among the various faculties in the schools, colleges, and universities.

The colleges and universities could be asked to bid on contracts to assist school districts or particular schools that are judged by the Board of Education to be performing below standard. Again, the Board and the Council could evaluate institutional proposals, and monitor the progress of the district or school being assisted.

Finally, we think that Virginia higher education should make efforts to be open to, and connected with, other "para-systems" of education throughout the state: adult literacy programs, state humanities and arts councils, apprenticeship programs, cooperative education, alternative schools, industrial training programs, and so on. More of these "para-systems" are developing and it seems to us preferable that they be linked together rather than each operating oblivious to the others.



We cannot place too much emphasis upon the importance of cooperation. Among colleges and universities, between the state-supported and the independent sectors, between two-year and four-year institutions, between higher and elementary-secondary education, between higher education and business, between higher education and government—all of these relationships should be improved and carefully nurtured to ensure that old barriers do not prevent Virginia from seizing new opportunities.

Neither governance nor administrative systems necessarily need to be changed. We are concerned about something more fundamental. We are asking the persons responsible for Virginia higher education to see things whole: to see that everything relates to everything else, and that behaviors must change in light of that understanding. The health of each college and university depends upon the health of Virginia's schools, businesses, and government. Our report repeats this point often and in different ways because it is central to the vision we are proposing.

X. Leadership of Virginia Higher Education

We know we have always been in danger
down in our separateness
and now up here together but till now
we had not touched our strength
— Adrienne Rich

Higher education has responsibilities that override the plans and aspirations of individual colleges and universities. Collectively, the institutions have the ability to affect the social, political, and economic conditions of the states and the nation. The way higher education is organized strongly influences the extent to which its work gets done and the ways in which it can answer to the needs of society. While this is also true of other functions of government, the unique intellectual and moral position occupied by colleges and universities in American culture places special obligations upon them.

Throughout our report we have emphasized our admiration for the way in which Virginia higher education has flourished as a loose system of colleges and universities with coordination by the State Council of Higher Education. In this brief section, we raise what seems to us to be the weakness inherent in this system: no one is in charge.

To some extent this is good, as we have noted. It permits institutions to flourish in their own ways, and fosters a diversity that gives students a wide range of choices among institutions.

It is possible to regulate a system so completely from the top that it has no fluidity. We think Virginia has wisely avoided this approach. But this means that the system of higher education rarely acts in concert and that cooperation is often difficult to achieve. Individuals with unusually strong imaginations and political and rhetorical skills sometimes can help the institutions to act as a system, but only temporarily. The system is inherently fluid.

Under these conditions, the governance of higher education in Virginia requires a kind of social contract: for it to work, the participants must agree to belong to the system. Unfortunately, there is not sufficient incentive to do so.

To be blunt: the present arrangement does not encourage or reward cooperation, risk-taking, or innovation. It tends to equate effective leadership of colleges and universities with acquisition of resources: staff, buildings, and money. The institutions seldom act together because they jockey for competitive advantage among themselves. They tend not to take chances or innovate, in part because the state's budgeting is based on "steady state" funding for all agencies, and because higher education has come to place a premium upon doing business as usual. In effect, the funding and rewards tend to equate success with acquisition of resources—as if what is good for each college and university is necessarily good for the people of Virginia.

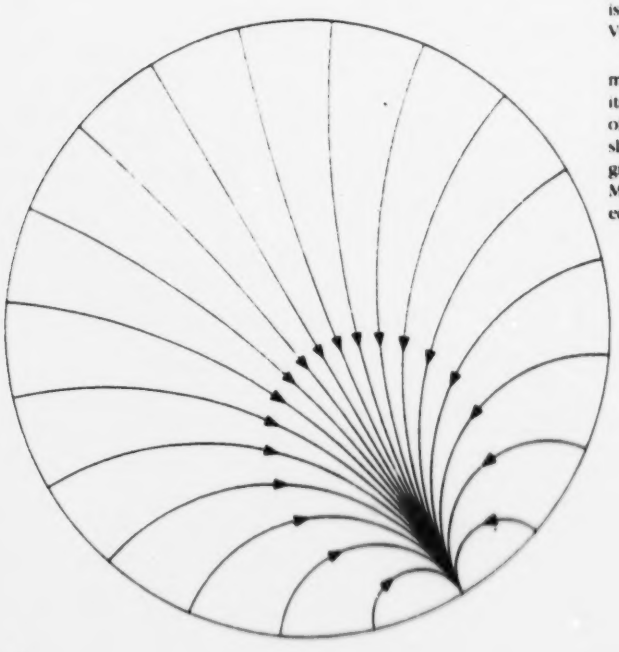
Not only should higher education act more as a system, it also should consider its responsibilities in the broader society of which it is a part. For example, only slightly more than half the high school graduates in Virginia go on to college. Many young people disappear from the educational system somewhere between ninth grade and high school graduation. Many children enter kindergarten with deficiencies that make it impossible for them to catch up. Twenty percent or more of the adult population may be functionally illiterate. The state will need to build a new prison every year for the next decade to keep up with the current rate of incarceration. The environment, both natural and constructed, is threatened. Health care, especially for children and the elderly, is becoming more expensive but not necessarily better. Employment in traditional Virginia industries is diminishing, and there is fear and want in some regions of the state. The gap between the wealthy and the poor continues to increase.

In a way, colleges and universities have nothing to do with these conditions, except insofar as they provide opportunities for research or teaching. But no one really believes that higher education can or should do its work and acquire its resources oblivious to the broader needs of Virginia or the nation. No one really believes that the colleges and universities should seek appropriations at one another's expense or at the expense of other agencies of state government. But that is how the system works.

If Virginia wants persons in responsible positions to behave differently, as we think they should, these people need to be assured that they are expected to act in the best interests of the state as a whole, and not just for the institutions they represent. They need to be assured that change is necessary and that it is their job to provide leadership that leads to change. At present, they do not seem to have that assurance.

As appointments are made to institutional governing boards the Governor should emphasize that board members are expected to discharge their responsibilities with concern for the well-being of all the colleges and universities and the general public. One criterion for assessing the performance of board members, presidents, and senior staff should be the extent to which their institutions are working with others in the system for the common good.

In any way possible, Governors, the General Assembly, members of college and university governing boards, and the Council of Higher Education should reward behavior that demonstrates institution's concerns for the problems of the broader society of which they are a part and from which they derive their support.



XI. Making The Right Kinds of Room

Many things are becoming
possible for us.
We are recalling
forgotten lore.
we are exploring
our own house and garden
— Annie Dillard

The State Council of Higher Education, working with the state's colleges and universities and subject to oversight by the Governor and the General Assembly, is responsible for planning the development of Virginia's system of higher education. To judge by the results achieved in the past 15 years, the planning processes of the Council appear to work well. They are flexible, relatively informal, and able to respond quickly to changed circumstances and new needs. A highly pragmatic, flexible, and continuous approach to planning is what the times require. The era of the thick, long-range master plan has passed.

During the course of its deliberations, the Commission received a number of proposals from Virginia's colleges and universities for change or growth. Instead of offering a detailed plan for expansion of the Virginia system of higher education, which is beyond our charge and would intrude upon regular planning processes that are working well, the Commission offers a set of policies on which decisions about programmatic improvements or increased enrollment should be made. The proposals of Virginia's institutions have been very useful to us in developing the following recommended policies.

1. Planning ought to be done not only by institutions but among them. We are not calling for sameness but we are calling for cooperation. We support competition among ideas but not for territory.
2. The current policy and practice of keeping Virginia's state-supported universities relatively small in comparison with those in some other states should be continued. Our reasons are simple. Smaller institutions are an attractive and distinctive characteristic of Virginia higher education. Particularly at the undergraduate level, many Virginia colleges and universities have reputations as places in which students receive personal attention. While other states have universities that are twice the size of Virginia's largest, and while some of them are quite good, Virginia has chosen another approach that has worked well and should be continued.

   In addition, Virginia has a coordinated system of colleges and universities whose strengths balance one another. For any of its universities to become massive, multi-campus institutions would upset the delicate political and educational balance upon which the present system depends.
3. Undergraduate growth should occur across an array of institutions that reflects the diversity of Virginia high school graduates. Growth should be approved at highly selective and moderately selective institutions, and at those to which admission is actually or virtually open.
4. Wherever growth occurs, it should be accompanied by curricular improvement. Institutions that propose to offer students new perspectives upon the arts and sciences, technology, and the professions should be the first authorized to accommodate more students if they propose to do so.
5. Funding for growth that takes place along with specific curricular improvement should be greater than that for enrollment growth alone.
6. Proposals for curricular improvement from institutions that choose not to increase their enrollments should be encouraged. Growth is not a prerequisite for change.
7. Proposals to accommodate more students should place special emphasis upon the education of minorities and women, both of whom will become more important participants in our society and the workforce.
8. The enrollment growth should consist primarily of Virginians, especially at colleges and universities that now enroll substantial numbers of out-of-state students. In this way, the percentages of out-of-state students should decrease while their absolute numbers will not.
9. Funding for growth should be separately identified to ensure that it does not occur at the expense of existing students, especially those who are undergraduates. Institutions that propose to grow should be providing adequate services to their present students. The curricular needs of existing students should be kept in mind as institutions consider new curricular approaches designed to accommodate growth.
10. Many adults will need continuing, advanced education within commuting distance of their workplaces or homes. This education should be provided by faculty on-site and by telecommunications where possible and appropriate. Either electronically or physically, faculty ought go to these students rather than vice versa.

We recommend that money be appropriated in the 1990 Session of the General Assembly to permit the Council of Higher Education, in cooperation with the institutions, to plan in response to these policies. Planning money will help to maintain the momentum that has been gained during the life of the Commission, as the state's colleges and universities considered ways in which they want to shape the future. Our work has stimulated a great amount of activity that will prepare Virginia higher education to

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meet the demands of change and growth in the coming decade and beyond. What is needed now is detailed planning and consideration of alternatives.

Beyond this set of policies, several other considerations should inform planning to accommodate change and growth.

The state's independent colleges and universities should be relied on to the greatest extent possible as enrollment demand grows. The fine Tuition Assistance Grant Program will continue to be an excellent way to assist Virginia residents who want to attend the independent colleges and universities. A need-based component in addition to the basic grant for which all Virginians are eligible would make it even more helpful. This program should continue to receive strong state support.

Virginia should consider expanding its program of contracts between the Commonwealth and selected independent institutions for instructional programs not readily available from state-supported institutions. The contracts might pay the difference between tuitions at the state-supported and independent institutions.

The Council of Higher Education should explore the feasibility of creating a category of "state-assisted colleges and universities," subject to the limits of the Virginia Constitution. Only independent institutions that offer instructional programs not available at state-supported institutions within a reasonable distance should be eligible to participate. They would be more accountable to the state (for instance, their academic programs and expenditure plans might be subject to approval by the Council and their accounts subject to state audit).

It should be easier for students who attend Virginia's community colleges to transfer to the senior colleges and universities. Each senior college and university should adopt a policy assuring that students who are granted admission after earning a community college degree will receive full academic credit for their work. This will, of course, require the community colleges to offer a good general education that is subject to quality assurance by the Virginia Community College System.

It is increasingly clear that the urban universities are facing a substantial demand for residential undergraduate education for traditional college-age students. More young students want to live on or close to campus. Much of the non-residential, commuter enrollment consists of graduate and professional students, and older adults, including a growing population of single parents, whose special needs must be met.

While large numbers of current undergraduates clearly prefer to live in residences on campus, state and institutional planners should remember that such preferences can change. Less than 20 years ago living on campus was viewed with disdain by many students and there were empty residence halls at some Virginia colleges. Moreover, many students live off-campus, especially those who are older and those who have families. Institutions that are not highly selective should be encouraged to look for alternatives to constructing and operating additional residence halls that could become a financial burden if a future generation of students decides it prefers to live off-campus.

The patterns of enrollment at urban universities can create highly stimulating intellectual environments for all students and faculty. We urge the urban universities to consider their opportunities carefully as they plan curricular and campus development. The mix of women and men of different races, cultures, and ages could make these institutions the most exciting places to be in the 21st century if the universities capitalize on the rich diversity of Virginia's urban areas.

The system should make maximum use of telecommunications to provide interactive televised and computer-assisted instruction from major college and university facilities to distant sites, recognizing that the effectiveness of such instruction depends upon the disciplines being taught, the methods of teaching, and the learning objectives of particular courses.

Virginia should consider creating a single credentialing entity that is responsible for coordinating all long-distance and off-campus instruction and, when several institutions contribute courses to a degree program, conferring degrees. Such an entity would promote instruction that is based upon acquiring and demonstrating competence rather than upon completing a prescribed number of credit-hour courses within the traditional academic calendar.

This new entity would be similar to Empire State College in New York and Thomas Edison College in New Jersey and have something in common with the British Open University. It would assume administrative control of the six regional consortia now operating under the auspices of the Council of Higher Education, the interactive television network that has been developed by the Council and several institutions over the past six years, and any additional telecommunications networks that may be created for instructional purposes in the future. Perhaps most important, it would broker educational services to meet emerging regional needs.

If the General Assembly authorizes the establishment of new campuses or institutions under the control of existing institutions, we recommend that statutory provision be made for their status to be reviewed every five years. The state should determine whether and under what conditions these new entities should become free-standing colleges and universities.

The growth of Virginia higher education will be coherent only if the state-supported colleges and universities adhere to the enrollment levels approved for them. The 1974 General Assembly Commission on Higher Education was quite explicit that "institutions should be expected to achieve the enrollment projected." But we sense confusion about whether the Council of Higher Education's enrollment projections are objectives to be exceeded if possible, targets to be met, or limits that may not be exceeded.

If planning for the 21st century is to be effective, the approved enrollment projections should determine the number of students each institution should attempt to enroll each year, neither more nor less. We recommend statutory change to make this point clear. The incentives to exceed approved levels are currently too strong, and the penalties for exceeding them too weak. The statute should include stiff penalties for exceeding approved enrollment levels unless the occurrence is beyond institutional control.

PLANNING AND SUPPORTING CHANGE:

Thoughts For The General Assembly

If Virginia's response to change and growth in higher education is to be orderly and thoughtful, the General Assembly's support is essential. Concerned legislators established the present coordinated system as a result of the work of the General Assembly Commission on Higher Education, which reported its recommendations to the 1974 Session. During the past 15 years progress has been remarkable. The system has grown by more than 75,000 students and its overall quality has improved. Some Virginia colleges and universities have become known as among the best in the nation.

Progress in funding has been particularly rapid over the past several years. Faculty salary averages, for instance, have increased 64 percent in the past six years. Well over $1 billion has been provided for college and university buildings during the past ten years. Under the unique debt-financed equipment trust fund more than $85 million worth of instructional and research equipment has been provided since 1986, with the possibility of twice that amount being available before 1998.

Grants to Virginians attending the state's independent colleges and universities have increased from $500 in 1978-79 to $1500 in 1989. Financial aid for needy students in the public colleges has grown from $3.8 million to $19.4 million over the same period. The statewide need-based program for students in public and independent higher education has doubled, and a new work-study program has been started. Funding for Eminent Scholars, a program that matches income from endowment with state money to attract and retain outstanding faculty, has increased from $755,040 in 1979 to $5.6 million in 1989. Overall, state general funds for higher education in Virginia more than doubled in a decade, from $871,065,510 in the 1978-80 budget to $2.128 billion in 1988-90.

Comparisons of support for higher education among the states are difficult because they fund higher education in so many different ways. Some states, particularly in the western part of the United States but also North Carolina, are committed to extremely low tuition as a matter of public philosophy. Others, like Virginia and the coastal states to the north, have relatively high tuitions. Some states (like Virginia) use tuition to pay for educational services, while others (like West Virginia) use most of it to pay debt service on capital outlay.

Nonetheless, the Commission notes that Virginia currently ranks 10th in per-capita appropriations and 11th in total appropriations for higher education (it is one of 11 states that appropriate more than $1 billion per year for higher education), and 19th in appropriations per $1000 of personal income. This is a good position to be in, but Virginia is behind such states as North Carolina, California, and Minnesota. We also note that Virginia's per capita income has risen at a substantially greater rate than its support of higher education over the past 20 years, and that the state-supported colleges and universities now derive 53 percent of their total operating revenues from sources other than the state's general fund. The people of this state can expect excellent colleges and universities only if they are willing to provide the funds needed to run them. We think it is important to emphasize that higher education will need more money in the decades ahead. We also think it is important to emphasize the importance of a predictable flow of funds to institutions that have to undertake fundamental changes.

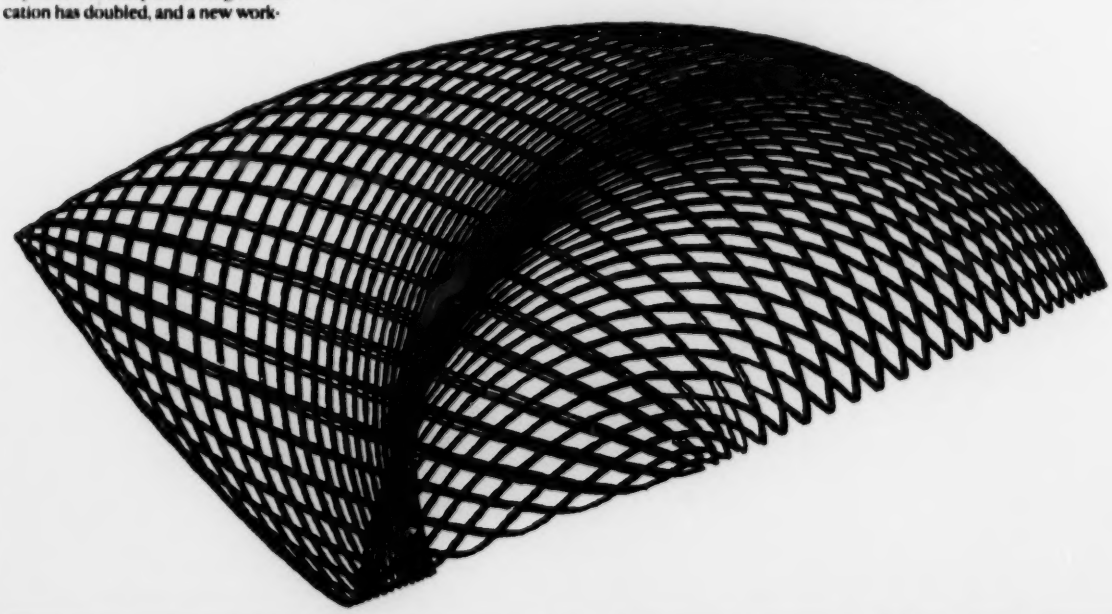
While being well funded does not necessarily guarantee high quality results, it clearly helps. In the long run a state can aspire to excellent education only if it is willing to pay for it.

Virginia has experienced several years of exceptional revenue increases and the colleges and universities have been among the beneficiaries. While higher education's share of the state's general fund appropriations has diminished somewhat, from 16.8 to 15.9 percent since 1981, increases in operating budgets for the institutions are among the highest in the nation.

We are aware that increased demands for state services of various kinds, mounting pressure to return more revenue to the localities, and slower rates of revenue growth may make the early years of the

The natural world is all of a piece. we all know this in our bones. but we have a long way to go before we will see how the connections are made.

— Lewis Thomas



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making time out of sheer flux is an act of the mind: to live fruitful and civilized lives in time is an act of the will

— A Bartlett Giamatti

next decade difficult. We think that the vision of higher education that we are offering is realistic and necessary for good times or lean.

First of all, the enrollment growth is coming, regardless of the rate at which state revenues increase. Whether additional funding is provided according to plans that combine growth with curricular improvement or simply as more students show up at the gates, the colleges and universities will need more money to serve more people.

Second, the growth will occur at a manageable pace: probably about 3,000 full-time equivalent undergraduate students each year from 1994 until 2005. We recommend that the growth be anticipated and that funds be provided in advance to prepare for it. This is preferable to providing funds after enrollment growth has occurred, which is what has tended to happen in Virginia over the past 25 years.

Third, we have recommended that Virginia maintain its commitment to the Higher Education Equipment Trust Fund and adopt alternative ways of financing some capital outlay for colleges and universities. This will help to relieve some of the pressure for new funds to support both instruction and research.

Fourth, we have recommended ways in which the resources available to higher education can be used more effectively—for examples, greater cooperation among institutions, offering instruction by television and computer, encouraging enrollment in the community colleges for the first two years of undergraduate education, and using the capacities of the independent institutions to the fullest.

Our proposals are not extravagant. We have tried to be realistic while at the same time stressing that changes must occur in Virginia higher education if it is to serve the people well in the next century. This is a vision for good, bad, or average state revenue growth.

The operating budget cost of adding 24,000 full-time equivalent students (a reasonable but conservative projection) to the enrollment of the state's colleges and universities is at least $133 million per year. This estimate assumes that the students will be distributed across the state-supported and independent institutions as they are today, and uses current levels of support per full-time-equivalent student. The capital outlay required to accommodate the same enrollment growth will cost about $500 million, equally divided between educational and auxiliary enterprise space.

Neither the operating nor the capital costs come all at once, of course. The capital investment can be made over a decade, while the operating budgets will gradually increase as the enrollments swell.

Most importantly, these estimates do not include money to make colleges and universities better, rather than just bigger. If the state accepts our recommendation that higher education's incremental funds be allocated to reward change, then growth and curricular improvement will compete for the same resources. There has to be enough available to make the competition worthwhile.

Planning fundamental change is complex and will be costly. But we think that Virginia's chances of success will be considerably improved if future administrations and legislatures commit themselves to provide a steady stream of funds to support transformation and selective growth within the system of higher education. We also think that it will cost more in the long run just to accommodate enrollment growth with spasmodic funding. Academic, administrative, and capital innovations need systematic support in order to succeed.

Virginia's colleges and universities have flourished because they have been supported by legislators who looked at the needs of higher education as a whole, rather than at the needs of some favorite institution. We urge the General Assembly to reaffirm its commitment to this perspective in its response to our report. Several of our recommendations require such an affirmation, at least implicitly.

New funding guidelines for operating or capital outlay budgets, for instance, can only be effective if they are endorsed by legislative leaders. Decisions about where enrollment growth should occur are useful only if they are one of the bases for allocating money and positions among the institutions, and the legislature rejects all end-runs.

The autonomy of Virginia's state-supported colleges and universities is one of the hallmarks of the state's higher education. Other state systems do not provide for separate governing boards to oversee each institution, and we recognize that several of these systems are very good. But diversity among the states is as important as diversity within them, and we are convinced that Virginia higher education has become what it is because institutional autonomy has been preserved.

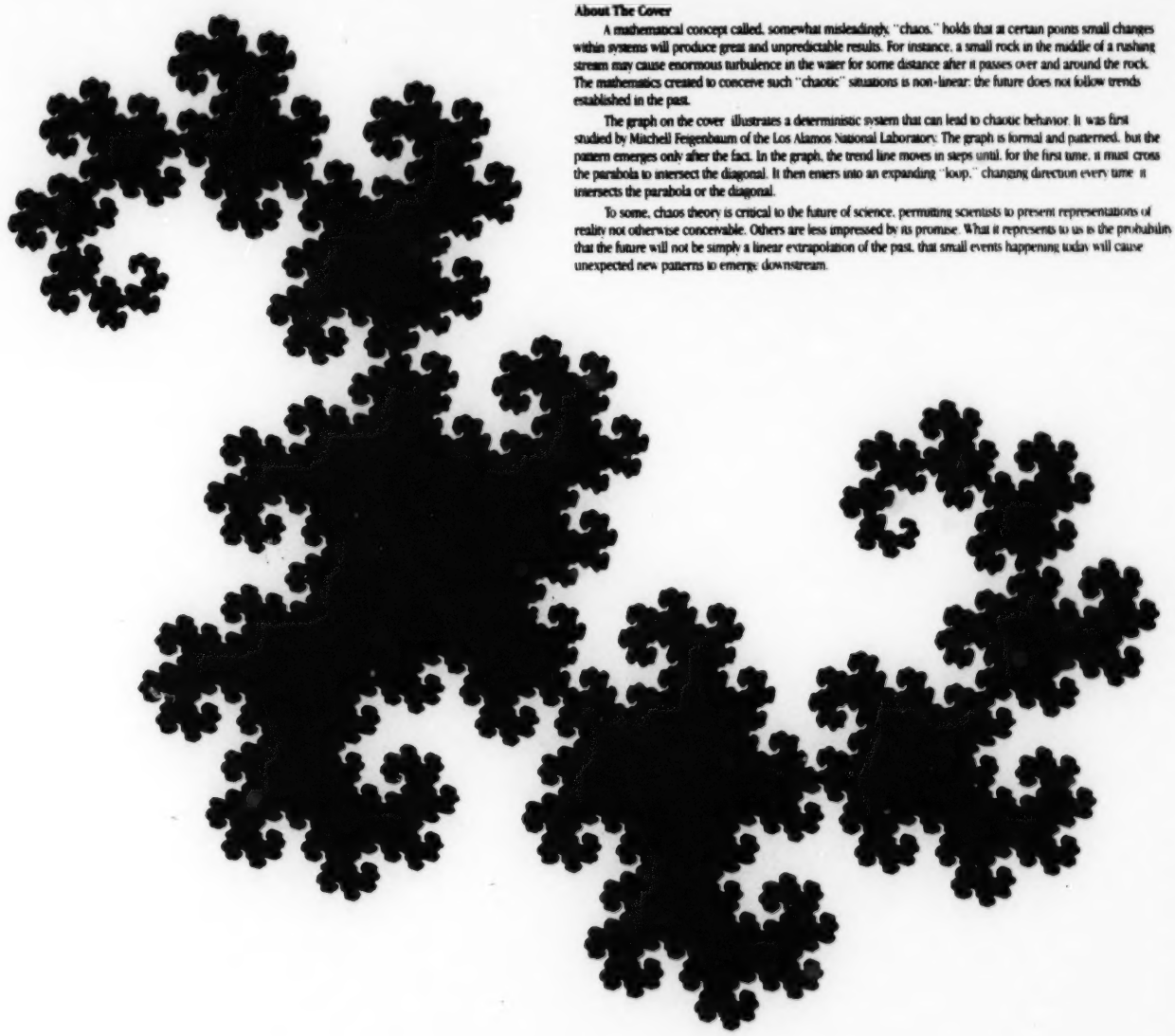
The president of one Virginia university commented upon another value that should be preserved: the cordiality that exists between state government and the colleges and universities, and between the state-supported and independent institutions of higher education. We are impressed by this characteristic of Virginia and urge that future actions strengthen rather than weaken the good relationships that now exist.

At the same time, we urge greater active engagement among the various parts of the education enterprise in Virginia. We prize cordiality but we want to see engagement: active, productive working relationships. This is what will really help students, businesses, and the state as a whole.

We assume that a course of action will be determined by the Governor and General Assembly after consideration of the recommendations of the Commission on the University of the 21st Century. As indicated by Governor Baliles in his charge to the Commission, we expect that specific planning will be done subsequently by the Council of Higher Education and the colleges and universities. A commitment to provide steady operating and capital outlay support will help to ensure that higher education serves Virginia and its citizens adequately over the next several decades.

But nothing much will happen without initiatives from those who are responsible for Virginia's colleges and universities. The Commission recommends that each state-supported institution be directed, and each independent institution be requested, to develop a detailed plan in response to this report and about its own view of the future by June 30, 1991, and forward it to the Council of Higher Education.

We do not suppose that everyone will agree with all that we have said. Too much agreement would be a sign that we have taken too few risks. Neither do we suppose that the changes we have recommended can be made quickly. But Virginia's system of higher education enjoys several advantages because it can undertake change at its own initiative rather than responding in a rush to external forces, can plan for growth before it happens, and contains strong colleges and universities whose fortunes are on the rise, along with those of the Commonwealth.



About The Cover

A mathematical concept called, somewhat misleadingly, "chaos," holds that at certain points small changes within systems will produce great and unpredictable results. For instance, a small rock in the middle of a rushing stream may cause enormous turbulence in the water for some distance after it passes over and around the rock. The mathematics created to conceive such "chaotic" situations is non-linear: the future does not follow trends established in the past.

The graph on the cover illustrates a deterministic system that can lead to chaotic behavior. It was first studied by Mitchell Feigenbaum of the Los Alamos National Laboratory. The graph is formal and patterned, but the pattern emerges only after the fact. In the graph, the trend line moves in steps until, for the first time, it must cross the parabola to intersect the diagonal. It then enters into an expanding "loop," changing direction every time it intersects the parabola or the diagonal.

To some, chaos theory is critical to the future of science, permitting scientists to present representations of reality not otherwise conceivable. Others are less impressed by its promise. What it represents to us is the probability that the future will not be simply a linear extrapolation of the past, that small events happening today will cause unexpected new patterns to emerge downstream.

Credits —

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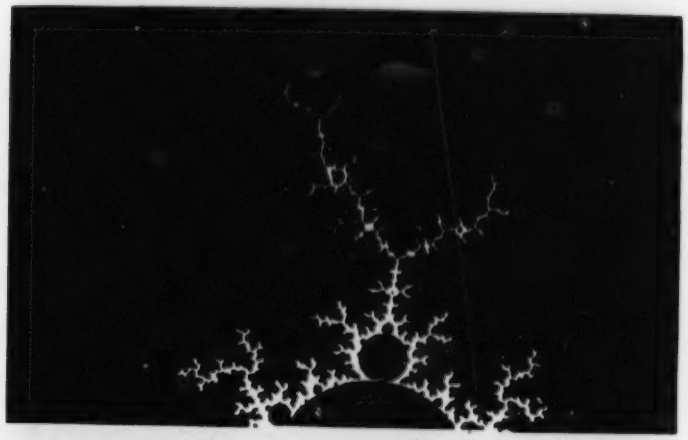

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